

Remarks/Arguments:

Claims 1-5, 7, 8, and 11-21 are pending. Claims 11-20 are withdrawn. Claims 1-3 are currently amended. The amendments are supported throughout the specification; for example, see pg. 12, lines 2-5; pg. 20, line 24 to pg. 21, line 6; and pg. 25, lines 3-7. Claim 21 is new and is supported in the specification, for example, at pg. 20, line 5 to pg. 21, line 21 and Figure 3. No new matter has been added.

Rejections under 35 U.S.C. §§ 103

Claims 1-5, 7, and 8 stand rejected as unpatentable over JP-022473 (JP '473) in view of JP 63-250492 (JP '492) and Masui et al. ("Warp Control in Strip Processing Plant"). Applicants respectfully traverse these rejections and submit that the currently pending claims are patentable over these cited references for at least the reasons set forth below.

"To establish a *prima facie* case of obviousness, ... the prior art reference (or references when combined) must teach or suggest all the claim limitations." M.P.E.P. §2143. Additionally, as set forth by the Supreme Court in KSR Int'l Co. v. Teleflex, Inc., 82 U.S.P.Q.2d 1385 (2007), it is necessary to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the prior art elements in the manner claimed.

A method for producing a plated film as defined in claim 1, as currently amended, includes at least the following technical features:

(a) the conductive surface of the resin film is brought into electrical contact with a cathode roll through an electrolyte layer for electroplating a plating layer on the conductive surface of the film;

(b) the following relation is satisfied $E_0 > [(I/Cs) \times d]/\sigma$; and

(c) the carrying tension T of the resin film is from 10 N/m to 320 N/m.

Claim 1 is not rendered obvious by JP '492, JP '473, or Masui, alone or in any reasonable combination, because they fail to disclose or suggest several features recited in claim 1. Accordingly, a *prima facie* case of obviousness has not been established for the reasons set forth herein.

First, JP '492 and JP '473, alone or in any reasonable combination, fail to disclose or suggest that the conductive surface of the resin film is brought into electrical contact with a cathode roll through an electrolyte layer for electroplating a plating layer on the conductive surface of the film.

As acknowledged in the Office Action, JP '473 fails to disclose or suggest that the conductive surface of the resin film is brought into electrical contact with the cathode roll through a liquid layer for electroplating a plating layer on the conductive surface of the film. Office Action pg. 6. As described in the specification and shown in Figure 3, and mentioned here to illustrate one exemplary embodiment of the invention recited in claim 1, a liquid (electrolyte) layer 8 is purposely formed at a certain thickness d. As shown in Figure 3, for example, the conductive surface 5 of the resin film 4a is brought into *electrical contact* with the cathode roll 1 through an *electrolyte layer* 8 for electroplating a plating layer on the conductive surface 5 of the film 4a. The conductive surface 5 is kept in electrical contact with the cathode roll 1 through this layer 8. In other words, the cathode roll need not be in contact with the film. See pg. 20, line 13 to pg. 21, line 6 of the specification.

On the contrary, JP '473 relates to forming a plating layer by using a plurality of plating baths, and as explained with reference to Figure 2, "[e]lectroplating in this plating tub 1 is filled up with the electrolysis solution 7 required for plating in a tub, and is performed via the power feeding roller 5 by forming an electric circuit between each anode 3 and the film 2 of a plated object." Pg. 3, para. 0012 of JP '473. The specification and figures of JP '473 clearly do not envision forming an electrolyte layer or bringing the conductive surface of the resin film into electrical contact with the cathode roll through an electrolyte layer.

The Office Action attempts to remedy the deficiencies of JP '473 with JP '492 because "JP '492 teaches that water and an electrolyte solution are selectively jetted from nozzles 12, 13 on the rolls 2 to remove deposits and electrodeposited matter on the surfaces of the rolls 2." Office Action pg. 7.

A partial translation of JP '492 was obtained, which explains the following:

JP '492 pg. 2, lower left column, line 12 to lower right column, line 12 (emphasis added):

In the method of the present invention, as shown in Fig. 1, **water** is jetted from a nozzle 11 to a back surface of the strip 1 at the vicinity of a conductor roll 2 after passing through a seal roll 6. Further water is jetted from nozzles 12 and 13 to a surface of the conductor roll 2. By those, a concentration of an electrolyte is reduced and electrodeposition to the conductor roll 2 is prevented as well as removing of deposits is performed.

By any chance, electrodeposition happened, electrodeposited matter is dissolved by jetting **electrolyte** to the conductor roll 2 from the nozzles 12 and 13. In this case, a polisher 8 used together for a mechanical removing provides an effective removing of the electrodeposited matter.

However, in this case, **it is necessary to prevent an electric feeding to the conductor roll 2** having the electrodeposition.

In the method of the present invention, as shown in Fig. 2, water and electrolyte are selectively jetted.

Pure **water** is always jetted to a back surface of the strip 1 from the nozzle 11. In the ordinary state, water is jetted from the nozzles 12 and 13, however where electrodeposition is occurred on the conductor roll 2, electrolyte is jetted.

JP '492 pg. 3, upper left column, lines 1-4 below the table (emphasis added):

In case of using water jetting, electrodeposition of Zn occurred about once per month, when the electrodeposition occurred, **electric feeding to the conductor roll was prevented and plating liquid was jetted.** The electrodeposited matter was quickly dissolved.

As is evident from JP '492, it is clear that electric feeding to the conductor roll 2 is prevented when electrolyte is jetted to the conductor roll 2 from the nozzles 12 and 13. In other words, at the time electrolyte is positioned between the strip 1 and the conductor roll 2, there is no flow of electric current between them in JP '492. Accordingly, it cannot be found or suggested in JP '492 that the conductive surface of the resin film is brought into electrical contact with the cathode roll **through an electrolyte layer** for electroplating a plating layer on the conductive surface of the film.

Additionally, Applicants note that JP '492 teaches away from bringing the conductive surface of the resin film into electrical contact with the cathode roll through an electrolyte layer for electroplating a plating layer on the conductive surface of the film. As cited above, JP '492 teaches the use of electrolyte to remove electrodeposited material on the conductor roll, and requires the electric current to be *prevented* (i.e., electric current is zero) while removing the electrodeposited material. Accordingly, if an electrolyte layer were to exist it could not be said to be an electrical contact between the resin film and cathode roll.

Thus, even in combining JP '473 and JP '492, as proposed in the Office Action, that hypothetical combination does not teach that the conductive surface of the resin film is brought into electrical contact with the cathode roll through an electrolyte layer for electroplating a plating layer on the conductive surface of the film, and a *prima facie* case of obviousness has not been established. In fact, JP '492 teaches away from this step of the method recited in claim 1.

Second, JP '492 and JP '473, alone or in any reasonable combination, fail to disclose the relation $E_0 > [(I/Cs) \times d]/\sigma$. As explained in the specification, this relationship was found to prevent metal intended to constitute the plating layer from being precipitated and deposited on the cathode roll. See pg. 23, lines 8-21 of the specification. The value "d" in the equation signifies the thickness of the gap constituting the electrolyte layer between the cathode roll and the conductive surface of the film. Accordingly, d is controlled to maintain electrical contact and to reduce undesirable precipitations/deposits on the cathode roll.

On the contrary with respect to JP '473, even if some of the electrolysis solution were to allegedly accumulate between the power feeding roller and film as suggested in the Office Action by capillary action or the like (Office Action pg. 7), the thickness of the electrolyte layer would not be controlled within the relationship as defined in claim 1. Similarly, JP '492 does not suggest maintaining an electrolyte layer between the resin and the cathode roll, and clearly does not contemplate satisfying this relationship.

Thus, even in combining JP '473 and JP '492, as proposed in the Office Action, that hypothetical combination does not teach satisfying the relation $E_0 > [(I/Cs) \times d]/\sigma$, and a *prima facie* case of obviousness has not been established.

Lastly, JP '473, JP '492 and Masui et al., alone or in any reasonable combination, fail to suggest the carrying tension T of the resin film in a range from 10 N/m to 320 N/m as claimed in claim 1. JP '473 relates to a film such as a polyimide film, but does not disclose an appropriate carrying tension T. JP '492 relates to a metallic strip which is continuously electroplated. JP '492 also does not teach or suggest that the carrying tension T of the resin film is from 10 N/m to 320 N/m. Similarly, Masui et al. discloses a metallic strip in a hot dip galvanizing line. One having ordinary skill in the art would recognize a big difference between the lower tension which is needed in a process for a resin film and a higher tension which is needed in a process for a metallic strip. None of the references, however, discloses or suggests

the claimed tension. Additionally, the tension also relates to the gap *d* of the electrolyte layer and impacts the electrical contact and relationship discussed above. See pg. 30, line 24 to pg. 31, line 3.

Thus, even in combining JP '473, JP '492, and Masui, as proposed in the Office Action, that hypothetical combination would not teach each and every element of the claimed invention. As none of the references, alone or in any reasonable combination, teaches each of the claimed limitations, Applicants respectfully submit that a *prima facie* case of obviousness has not been established, and the rejection of claim 1 should be withdrawn. Claims 2-5, 7, and 8 depend, directly or indirectly, from claim 1 and should be allowable as dependent thereon.

With respect to new claim 21, JP '473, JP '492, and Masui, alone or in any reasonable combination, fail to disclose or suggest that the electrolyte layer is supplied by a separate electrolyte accommodating pan. New claim 21 is supported in the specification, for example, at pg. 20, line 5 to pg. 21, line 21 and Figure 3. No new matter has been added. As explained in the specification and as shown in the Figures, the resin film in one exemplary embodiment is carried into a plating solution accommodated in a plating bath and is brought into electrical contact with the cathode roll through an electrolyte layer, which is supplied by a separate electrolyte accommodating pan. These can be two separate and distinct solutions (the plating solution and the electrolyte), which are supplied by two separate baths (the plating bath and the electrolyte accommodating pan). JP '473 only contemplates use of a single bath. JP '492, as discussed above, fails to disclose that the conductive surface of the resin film is brought into electrical contact with the cathode roll through an electrolyte layer for electroplating a plating layer on the conductive surface of the film. Masui et al. also does not remedy this deficiency. Accordingly, new claim 21 should not be rejected based on the prior art cited in the Office Action.

Conclusion

For all of the foregoing reasons, Applicants respectfully request reconsideration and allowance of the claims. Applicants invite the examiner to contact their undersigned representative if it appears that this may expedite examination.

Respectfully submitted,



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